DOCUMENT RESUME

ED 262 994 SE 046 208

AUTHOR Bailes, Edith G.; Lipovsky, Louis J.
TITLE But Will It Bite Me? A Reference Book of Insects for Children--and Their Grownups.
REPORT NO ISBN-0-9611118-1-X
PUB DATE Nov 85
NOTE 113p.
AVAILABLE FROM Cardamom Press, P.O. Box 99, Richmond, ME 04357 ($9.95).
PUB TYPE Books (010) -- Guides - General (050)

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS *Animals; *Biology; Ecology; Elementary Education; *Elementary School Science; *Entomology; Science Education

ABSTRACT

This publication serves as a guide on insects for elementary school age children. The information is geared to answer the most commonly asked questions by children about insects (such as whether a given insect bites). Facts are also presented on how and where insects live, what they eat, and what eats them. The introductory chapter explains the growth and life cycle patterns of insects. Specific descriptions are given in the remaining chapters for: dragonflies; grasshoppers; praying mantises; spittlebugs; fireflies; ladybugs; mosquitoes; flies; blackflies; fleas; ants; bumblebees; and honeybees. (ML)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED262994

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

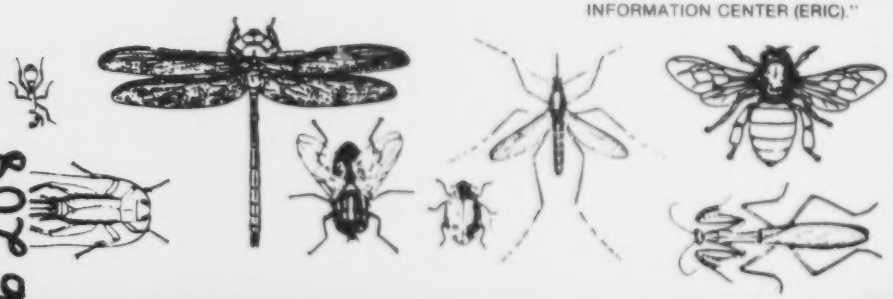
• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

BUT WILL IT BITE ME?

"PERMISSION TO REPRODUCE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY Edith G. Bailes

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Edith G. Bailes with Louis J. Lipovsky



SE 046 208

A reference book of insects for children — and their grown-ups

BUT WILL IT BITE ME?

Edith G. Bailes
with Louis J. Lipovsky

Examination
Copy
CARDAMOM PRESS
Box D
Richmond, Maine 04357

Cardamom Press
Richmond, Maine 04357

BUT WILL IT BITE ME?

Copyright © 1984 by Edith G. Bailes

All rights reserved. No part of this book may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, recording, or by any information storage and retrieval system, without permission in writing from the Author.

LIBRARY OF CONGRESS CATALOG CARD NUMBER 85-071440

ISBN 0-9611118-1-X

Printed in the United States of America

1

2

4

TABLE OF CONTENTS

How Insects Live and Grow	5
Dragonflies	27
Grasshoppers	35
Crickets	39
Praying Mantises	45
Spittlebugs	48
Fireflies	50
Ladybugs	52
Mosquitoes	55
Flies	57
Blackflies	60
Fleas	63
Ants	66
Bumblebees	74
Honeybees	84

Also by Edith G. Bailes:
AN ALBUM OF FRAGRANCE

IN APPRECIATION

This book represents a tiny fraction of the vast amount of knowledge Louis Lipovsky has of the insect world. He shared it with me with unfailing patience, good humor and tact. It is a rare privilege to have the chance to learn from someone who knows as much as he does, and I appreciate it. Thank you, Louis. I couldn't have done it without you.

This book is for Jordan

HOW INSECTS LIVE AND GROW

Unless something has gone very wrong, every person is born with certain parts, and a certain shape or form: two legs, two arms, a head, and so on. As we humans grow bigger, we still keep the same basic form; it never changes.

The wondrous thing about insects is that they may change shape many times as they grow, and the different shapes may not look anything like each other. When you look at a baby insect, you can't always tell what it is going to look like as an adult.

The word for changes that insects go through is *metamorphosis*.

Every insect starts as an egg. The kinds of changes an insect goes through after it hatches out of the egg depend on what kind of insect it is.

Inside our bodies are many bones. Our bones are hard and strong, which is why we can stand up and walk, and why we have the shape we do.

Insects don't have any bones. They are held together and given their shapes by their hard outer covering. This covering can't grow as the insect grows inside it. Instead, a new, soft covering forms inside the old hard one. Then the old covering comes off, usually by splitting up the back. The new, bigger covering hardens, and it also splits and comes off as the insect grows even bigger. An insect may shed its covering several times as it grows. Each shedding is called a *molt*.

While an insect is going through these molts it is called a *nymph*. Each stage of growth between molts is called an *instar*. At the last molt, the adult insect emerges. This kind of change in the insect is called *simple metamorphosis*. A dragonfly is one kind of insect that grows through simple metamorphosis.

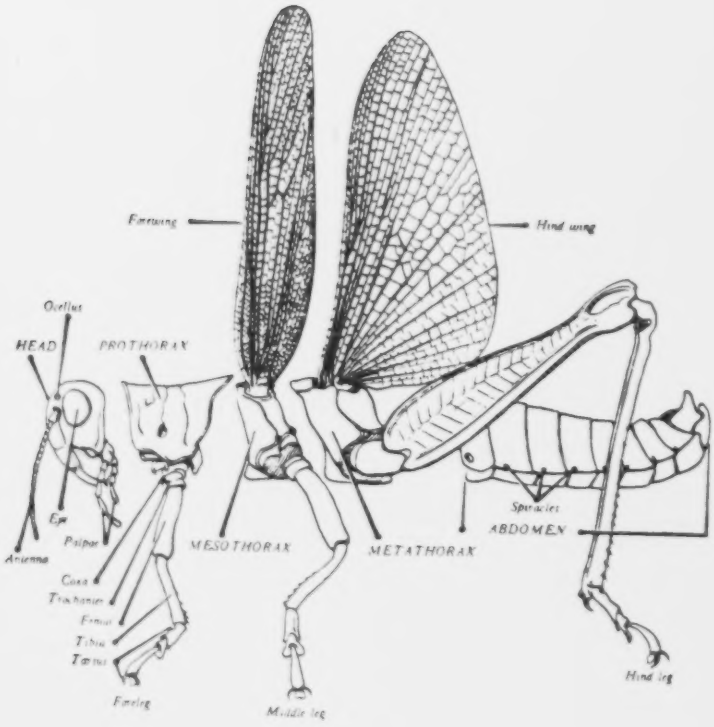
Other kinds of insects go through even more changes as they grow. When they hatch, they look a little bit like short worms, except that they may be almost any color, and some of them have legs. These creatures are called *larvae*. One of them is called a *larva*.

Larvae molt several times, growing bigger each time. As they grow, they usually change in other ways too. At the last molt, each larva changes into what is called a *pupa*. Pupae don't move around at all, and they don't eat. They may make themselves little cases or cocoons to live in while they are pupating.

After a certain length of time, pupation is finished, the cocoon or case opens, and the adult insect emerges.

Insects that pupate are said to undergo *complete metamorphosis*. Ants and bees, for example, undergo complete metamorphosis.

All adult insects have six legs. Their bodies have three parts, and they usually have four wings. They usually live only a few weeks or sometimes only a few days, depending on the kind of insect. A queen ant or a queen bee, though, may live several years.



Exploded Grasshopper

Some children are afraid of insects. Some grownups are afraid of them too! They think the insects are going to come after them to bite them, or to harm them in some other way.

Some insects do come after us to bite us. Mosquitoes do, and fleas do, and blackflies do. These insects, and some others, bite us because our blood is their food.

There are many other insects, though, that do not eat blood. They don't need to bite us to get their food. Many of these insects *can't* bite us because their mouths are not made for biting people. They don't have anything to bite us *with*.

The insects that do bite us, bite us with their mouth parts, which are in their *front* ends. Some insects can sting us, and the stinger is usually in their *rear* end. Other insects can pinch us, and the pincher might be in the insect's front end or its rear end.

Insects that can sting or pinch us won't, usually, unless we bother them in some way. What bothers insects the most is our keeping them from getting to the food they need, or damaging their nests.

You can watch ants for hours at a time and they won't hurt you, but step on a nest and they are likely to bite or sting. You can stand quite close to watch bees working in the flowers, and as long as you don't touch them or get in their way, they won't sting you. But if you stand between the bees and the flowers, or if you break into their hive to take their honey, or if you stand right in front of their hive as they are trying to bring their food home, they may sting you.

Just remember that most insects won't bother *you* if you don't bother *them!*

Even though insects sometimes bite or sting or pinch us, and even though some of them eat plants and other things that we want for ourselves, and even though some insects can make us sick, we still need to have insects in this world. We need to have insects in order to have some of the other things we like and need.

Some insects give us things we like very much, such as honey. Some insects help us by eating other insects so there won't be so many of them. Some insects help clean up dead animals and plants. Some insects are food for birds or fishes. In some parts of the world, people eat insects.

Many of the beautiful birds we enjoy watching in the spring and summer eat nothing but insects. If there were no insects, we wouldn't have any swallows or swifts or flycatchers or whippoorwills or vireos or nighthawks or kingbirds, because there wouldn't be anything for them to eat. Lots of other birds would be very hungry, because they eat a lot of insects even though they eat other things too.

The most important thing that insects do for us is something we might not notice or think much about. Inside most flowers is a sort of powdery golden dust called *pollen*. As an insect visits a flower, some of the pollen sticks to the insects, and some of the pollen from the last flower it visited falls off in the new flower. In other words, the insects carry pollen from one flower to another. The insects are said to be *pollinating* the flowers. Many flowers can't grow to become fruits, or make seed, unless they are pollinated; and a great deal of pollination is done by insects.

Thanks to the insects, we have apples for pie and lots of other good things to eat; and we have plenty of seeds to plant so we'll have more flowers next year. Without insects, especially bees, a lot of good things we like to eat, and a lot of the flowers we enjoy, could not grow.

Insects are always interesting, and some of them are very beautiful. If you are interested in insects, you don't ever have to be bored. You can study insects no matter where you are, and no matter how old you are, and you can do it without spending any money! The insect world is so huge that new kinds are still being found. Maybe you will discover a new insect.

This book will tell you some things about insects that you may see quite often. Because we wanted to make the book easy to read, we had to leave out a lot of things. If you need to know more about these insects, or if you need to find out about insects that are not in this book, there are many other books you can use. Some of them are listed in the back of this book. You will probably be able to find them at your public library.

Beside the name of each insect in this book you will see another name that may look strange to you: DRAGONFLIES (Order *Odonata*).

Scientists have sorted all known insects into big groups called *orders*. All insects in each order are like each other in some way. Each order is named in a language called Latin.

Each kind of insect also has two Latin names of its own, like your own first and last name. A certain kind of mantis, for example, is called *Mantis religiosa* in Latin.

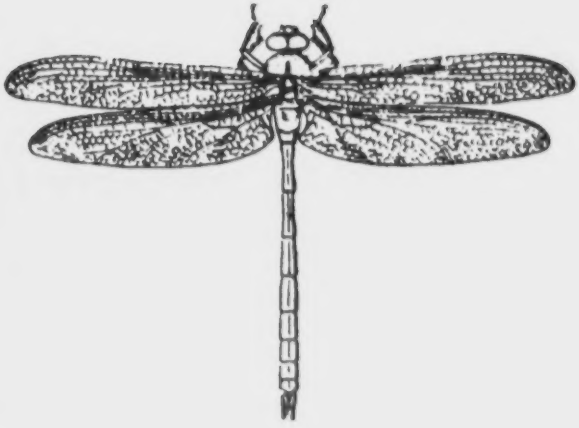
People may call an insect by many different *common* names. *Dragonfly* is a common name for a certain kind of insect. The same insect may also be called a *darningneedle* or *darner*. People who speak French or Spanish, or other languages have still other names for the same insect.

So when scientists from all over the world want to talk to each other about an insect, they need a way to make sure they're all talking about the same insect. If every scientist uses the Latin name there won't be any confusion.

(Plants and animals have Latin names too. *Chrysanthemum* is the Latin name for one kind of flower, and its common name too.)

We have made the pictures in this book much bigger than the insects really are, so it will be easier for you to see what they look like. Beside each insect's picture is a line like this: ⊢——————⊣
The line shows you how long that insect really is.

We hope you will enjoy using this book to learn more about insects.



Dragonfly

26

28

1

DRAGONFLIES
(Order Odonata)

You can see adult dragonflies flying through the air in the summertime. They look like little airplanes. As they fly, they use their front legs to catch and eat mosquitoes and other small insects.

Dragonflies (they are not really flies) spend most of their time in the air, because that's where their food is. They can fly backward as well as forward, or they can hover. When a dragonfly is hovering, it is still flying but it stays in one place in the air.

To help them see the insects they catch for food, dragonflies have very large eyes. Their eyes take up most of the space on their heads! With these special eyes, dragonflies can see in all directions at once. They can see tiny insects that we can't easily see. Dragonflies help us by catching so many other insects. If there were no dragonflies, we'd all have a lot more mosquito bites!

Dragonfly legs are special too. They are made for grabbing other insects out of the air. Because of their special legs, dragonflies aren't very good at walking. That's another reason why they fly so much.

The female dragonfly sometimes lays her eggs on plants that grow in ponds or streams. Sometimes she just flies low over the water and lets the eggs wash off her body into the water. The baby dragonflies (nymphs) hatch in the water.

The baby dragonflies stay all winter in the pond or stream. They move around on the bottom, eating other insects and growing bigger and bigger. Baby dragonflies don't have wings. They move mostly by taking water into their bodies and squirting it out again. They are jet-propelled!

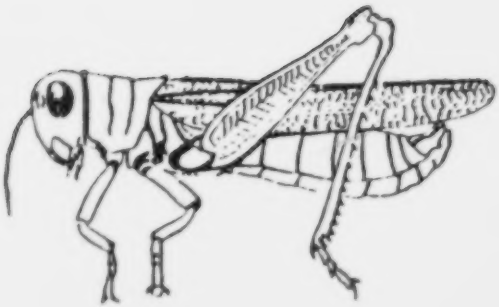
When spring comes, the dragonfly nymph climbs up out of the water into the sunlight. As soon as the sun has dried its skin, the nymph bends over so that its skin splits up the back. Inside the skin is a brand-new adult dragonfly! It shakes out its beautiful new wings, waits a few minutes while the wings dry and become strong, and then flies away.

You can be outdoors with dragonflies in the air all around you, and you don't have to be afraid of them. They can't bite you or sting you. If they come near you, it is because there are mosquitoes or other insects in the air near you. The dragonfly wants to catch them.

Dragonflies are sometimes called "darning needles." People used to tell children that dragonflies would stitch children's mouths shut, or stitch their ears to the sides of their heads! But now children know that dragonflies can't do any such thing.

If you catch a dragonfly in your hand, it might pinch you, but it really isn't fair to try to catch dragonflies. You might break their wings, or hurt them in some other way so that they can't fly. If they can't fly, they will die.

Dragonflies are hard to catch anyway, because they can fly so fast. They can fly as fast as 40 miles per hour. If you do catch one, hold it very gently so you don't hurt it. Look at it carefully and notice its big eyes, the coloring of its body, and its beautiful filmy wings. Then let the dragonfly go, so it can be free in the air where it belongs.



Grasshopper

2

GRASSHOPPERS
(Order Orthoptera)

Grasshoppers come in several different sizes and colors. They may be this big or this big or almost any size in between. Some grasshoppers are green and some are gray or brown or speckled. Some have wings to fly with and some don't. When a grasshopper is sitting still, it is hard to see whether it has wings or not.

If you see an insect shaped like the insect in this picture, you can be pretty sure it's a grasshopper, no matter how big it is or what color it is.

Grasshoppers can "sing" but they don't sing with their mouths as we do. They make their songs by rubbing one wing against the other, or by rubbing a wing with one leg. Grasshoppers can make very loud songs in this way.

Most grasshoppers don't eat other insects. They only eat plants. Many people don't like grasshoppers because the grasshoppers eat plants that the people want for themselves.

Some kinds of female grasshoppers lay eggs in the tall grass or weeds, but most kinds lay their eggs in soft, dead wood or in the soil. Baby grasshoppers look just like grownup ones, only smaller, but baby grasshoppers don't have flying wings, even if they are the kind that will have wings when they grow up.

Grasshoppers have long, strong hind legs that help them make very long jumps. If you try to catch a grasshopper, it might jump away just as your hand comes close to it. If you want to catch one, the best time to try is early on a summer morning. The grasshoppers will be cold then, from a long night without sunshine. When they are cold, they can't jump very far, so they are easier to catch.

Grasshoppers can't hurt you at all. They can't bite you or sting you or pinch you. You can hold a grasshopper in your hand — until it jumps away!

Some people use grasshoppers as bait for catching fish. Many birds eat grasshoppers: bluebirds, mockingbirds, hawks, brown thrashers, meadowlarks — almost any bird that eats insects will eat grasshoppers.

Spiders eat grasshoppers too. They catch the grasshopper in their webs. The spider can wrap the grasshopper in silk and save it to eat later.

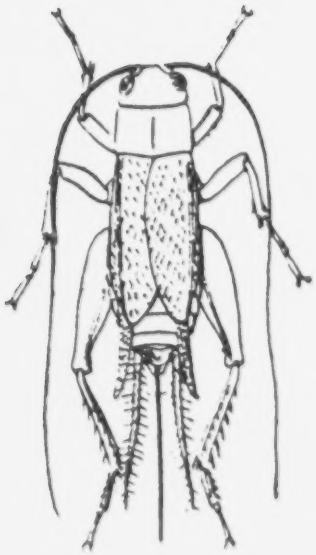
3

CRICKETS
(Order Orthoptera)

Crickets look a little bit like grasshoppers; they are related to each other.

Crickets usually live outdoors under stones, or under logs or old boards. Some of them live in burrows in the ground. Some crickets can fly and some can't.

Many crickets eat other, smaller insects. Some crickets only eat plants.



Cricket

The females of most kinds of crickets lay their eggs in the fall. Some lay their eggs on or in the stems of bushes, some in the soil, and others in the bark of trees. In places where the winters are cold, the baby crickets will not hatch out of the eggs until spring.

Male crickets can "sing" by rubbing parts of their front wings together. Some will sing only at night. Others sing in the daytime as well as at night. Female crickets don't sing at all. When they sing, the male crickets stay in one place and hide. The female crickets move around, trying to find out where the song is coming from.

Crickets sing or chirp quite fast when the weather is warm. As it gets cooler and cooler, the chirps get slower and slower. You can tell how cold it is by how fast the cricket is chirping. Here is how to do it: Keep track of how many times a cricket chirps while you count slowly to thirteen. Add 40 to the number of chirps you counted, and that should be about what the temperature is in degrees Fahrenheit. Try it and check your answer with a thermometer. How close did the cricket come?

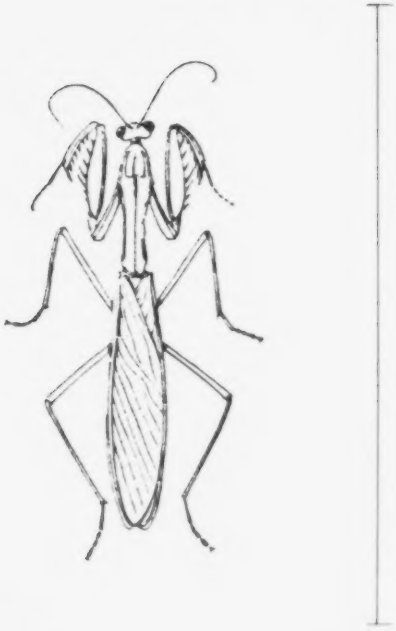
Crickets can hop very fast, but they can't bite you or sting you or pinch you. If you want to get a good look at a cricket, you can catch one in your hand if you are quick!

If you hear a loud "CHIRP! CHIRP!" in your house, it might be a cricket. Crickets like to come into our houses in the fall. The weather is getting colder, and they are looking for a warm home.

Some people like to have a cricket in the house. They think the cricket will bring them good luck. They find a cricket, put it in a tiny covered basket, and bring it home. They keep the cricket for a pet!

Crickets make very good pets. Here is how to make a house for your pet cricket to live in: Fill a clay flowerpot with good garden soil. Put a glass chimney from a kerosene lamp into the soil. Then put the cricket in the chimney! You can watch your cricket through the glass, but the cricket can't get out.

To keep it happy, feed your cricket tiny bits of salad greens, breadcrumbs, and uncooked oatmeal.



Praying Mantis

4

PRAYING MANTISES
(Order Orthoptera)

Most praying mantises are very large insects. They are likely to be green. When they are crouched on a green plant, they can be very hard to see.

Praying mantises got their name from the way they hold their front legs. Mantises eat other insects, and in order to be ready to grab the insects when they come by, the mantis holds its front legs up in front of its face. This makes it look as if it is saying its prayers!

Praying mantises are so big that they can catch very big insects. They can catch and eat beetles, grasshoppers, and crickets, as well as many smaller insects. They help people a lot by eating so many other insects. They will even eat other mantises!

Female praying mantises lay their eggs on the stems of grasses and small bushes out of doors. The eggs are laid in a mass of foam, which gets hard and brownish as it dries.

You can find mantis egg cases in the fields in the fall of the year. The best time to look for them is just after a light snowfall. This makes the egg cases easier to see.

The baby mantises will hatch out of the eggs in the spring. Baby mantises look just like the grownup ones, but they are much smaller. They hatch out when the weather has begun to get warm, so there will be plenty of other insects around for them to eat. If the baby mantises can't find enough other insects to eat, they will eat each other!

You can carefully catch a praying mantis in your hand and watch it for a while. It can't bite you or sting you or pinch you. Hold it carefully so you don't hurt it. After you have watched it for a while, put the mantis gently on a nice green plant. Then it can keep right on catching other insects.

5

SPITTLEBUGS or FROGHOPPERS
(Order Homoptera)

If you walk through the tall grass in the summertime, you may see blobs of white foam on some of the plants. Sometimes you see foam on pine trees and other evergreens, too.

If you carefully wipe the foam away, you can see that there is a tiny creature under it. This creature is the young (called a nymph) of the spittlebug, or froghopper.

The adult female spittlebug lays eggs on the weeds and grasses. As soon as a nymph hatches out of an egg, it begins to suck sap out of the plant with its sharp mouth parts. The sap is its food.

Very soon, a drop of clear liquid comes out of the nymph's body near its tail. This liquid is made of extra sap mixed with chemicals from the nymph's body.

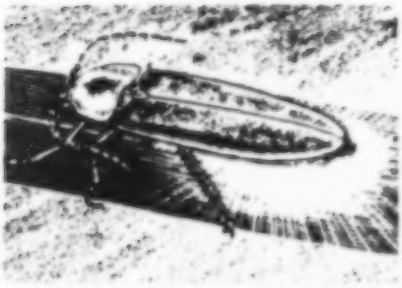
Then the spittlebug nymph begins to whip its tail up and down. This works a sort of pump in the nymph's abdomen, which blows air into the sap, turning it into the white foam you see on the grass.

Then the spittlebug nymph reaches back with its legs and pulls the foamy sap up around its body and head, like a blanket. Inside its blanket of foam, the spittlebug is hidden and safe. The foamy blanket makes a cool, shady home. Birds or insects that might like to eat the spittlebug nymph can't find it! The nymph is hidden in the foam.

Spittlebugs can't bite or sting or pinch you.

6

FIREFLIES
(Order Coleoptera)



In the early summer, as soon as it begins to get dark in the evening, a kind of magic happens in the fields.

Tiny lights flash on and off, on and off, like the sparkles reflected from sunlit water.

The fireflies are out. Summer is here.

The fireflies have, in their abdomens, a special substance that can make light without making any heat. The fireflies flash their lights so they can find each other in the dark.

Baby fireflies (larvae) live on the ground, where it is damp and cool. They eat many other small creatures including slugs and snails.

Firefly larvae help us by eating many snails that might otherwise damage our gardens, but adult fireflies help us most of all, by making the summer nights so beautiful.

You can catch fireflies in your hand. They can't bite or sting or pinch you.

Even though we call them fireflies, or lightningbugs, they are not really flies and they are not really bugs. A firefly is a special kind of insect called a beetle.

7

LADYBUGS or LADYBIRDS *(Order Coleoptera)*

Ladybugs aren't bugs, and ladybirds aren't birds! *Ladybug* and *Ladybird* are two names for the same insect, a special kind of insect called a beetle.

Ladybird beetles are very pretty. They come in many different colors, but they are usually orange or red, with black and white or yellow spots.

Ladybug

Ladybird beetles live on plants, but they do not eat the plants. They eat tiny insects, called aphids, that live on and eat the plants. A ladybird can eat many, many aphids every day. This is very helpful to us, because the ladybirds keep our plants from being eaten by the aphids.

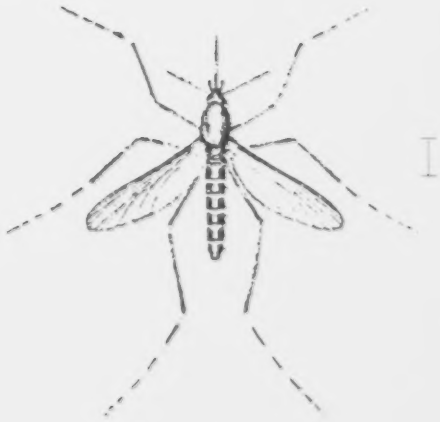
When another insect tries to grab a ladybird to eat it, the ladybird can squirt a bad-tasting liquid from places on its legs. Sometimes when another insect tries to grab it, the ladybird just pretends to be dead, until the other insect goes away.

When the weather begins to get cold in the fall, ladybirds sometimes come into our houses. Ladybirds don't eat anything during the cold weather, and they don't lay their eggs then either, so they can't do any harm by being in our houses.

Of all the insects that eat other insects, the ladybird is one of the most helpful to us. So if you find a ladybird, be nice to it! You can pick it up and watch it walk on your hand. It can't bite you or sting you or pinch you. When you've finished looking at it, put it carefully on a nice green plant. Maybe it will fly away home! Ladybirds have wings, but they only fly in the daytime.

8

MOSQUITOES
(Order Diptera)



Mosquito

There are many, many kinds of mosquitoes in this world, and some of them can make you very sick if they bite you.

Female mosquitoes are the ones that bite. They draw out some of your blood, which is their food.

If you want to, you can watch a mosquito bite you and fill its abdomen with blood. The mosquitoes that live in the northern United States are not the kind that are likely to make you sick, but you will have an itchy mosquito bite.

Female mosquitoes lay their eggs outdoors in still water. The baby mosquitoes (larvae) live on in the water after they hatch. They may be in ponds, puddles, old tin cans, old tires — anything that holds water may have mosquito eggs or larvae in it.

If you check around your yard and empty any buckets or other containers that can hold water, you may not have so many mosquitoes around. Leave the containers upside down so they won't fill up with rainwater again.

Lots of different birds eat mosquitoes.

9

FLIES
(Order Diptera)

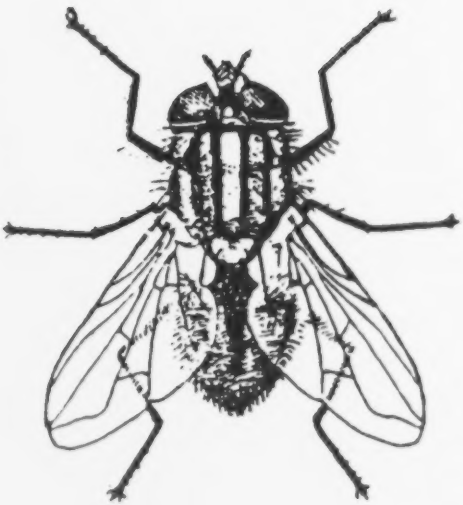
There are more different kinds of flies than almost any other insect. They can be found all over the world.

Flies come in many sizes, from little tiny "midges" and "no-see-ums" to big horseflies and deerflies.

Some kinds of flies don't have any wings at all. If a fly does have wings, it will only have two. This is what makes it a fly! Most other insects have four wings.

Flies usually have very big eyes, and special feet so they can walk upside down on the ceiling!

Flies lay their eggs in many different places, including living or dead animals, and fruits. The creatures that hatch out of the eggs have no feet and seem to have no heads. They look a little bit like short worms, and they seem to move by stretching and shrinking themselves. These creatures are called maggots, and they feed on whatever the eggs were laid on. It's hard to believe that a maggot can grow up to be a fly!



Fly

Some flies bite and some don't. Some flies are dangerous to us whether they bite or not, because they carry germs that can make us very sick. Other flies damage the plants of our gardens or farms.

Many other flies help us by eating other insects, by pollinating plants, and by cleaning up dead animals. Many different kinds of birds eat flies.

10

BLACKFLIES
(Order Diptera)

In the spring, the blackflies come out, and the females begin biting every living creature in sight.

When the blackflies are biting, it is hard to stay outdoors for very long. If you wear long pants, and shirts with long sleeves, that helps. If your clothes are light in color, that helps too. Nothing helps very much, though!

There is a legend that long before the European settlers arrived in New England, the Indians were using blackflies to help in their system of justice. During the blackfly season, when an Indian had done something very, very bad, the other Indians would take away all his clothes. They would chase him into the woods with nothing on, as punishment for what he had done. The blackflies could bite him all over unless he could find a pond or lake and stay in the water.

The next time the blackflies are biting you, think how it would feel if you had no clothes on!

We might think that life would be nicer if there were no blackflies, but like every other living creature, the blackflies are on the earth for a reason.

Do you like to go fishing? Blackfly young (larvae) live in fast-flowing streams and brooks, stuck to the rocks and other underwater objects. During the winter, the blackfly larvae are almost the only thing some fish — such as the speckled trout — can find to eat. If there were no blackfly larvae, there might not be so many fish for you to catch.

Do you like to watch birds? Many birds including swallows, swifts, and kingbirds, eat nothing but insects. During the blackfly season, there aren't many other insects around. Blackflies help keep these beautiful birds alive.

A few weeks of discomfort from the blackflies seems like a small price to pay for trout and swallows!

11

FLEAS
(Order Siphonaptera)

If you have a cat or a dog, you have probably seen a flea. Fleas live on cats and dogs, and on other furry animals such as squirrels and mice.

Female fleas lay tiny, pearly white eggs on the animals. The eggs are about the size of grains of salt. You can sometimes see the flea eggs if you look closely at your pet's bed just after the animal gets up from a nap. The eggs fall off the cat or dog while it is sleeping.

Baby fleas (called larvae) hatch out of these eggs. If they hatch in the house, the larvae eat dirt and dust on the floor or in rugs or furniture. Outdoors, they feed on plant or animal materials.

After several days, the flea larvae spin themselves cocoons. Each larva makes its cocoon by wrapping itself with a silken thread that comes out of a special hole in its body.

While the flea is in the cocoon, it is pupating. It changes while it is in the cocoon, and it can stay in the cocoon for as long as six months.

Flea

What comes out of the cocoons? Jumping, biting fleas! If there is no cat, dog, or other furry animal nearby, the

fleas will jump onto people and bite them. Fleas bite people and animals to get blood. The blood is the fleas' food. But if they can't find an animal or person to bite, the fleas can live for a year or more without eating.

Your cat or dog may not have any fleas on its body. Then it goes outdoors and comes back in with fleas! Fleas that are living on a squirrel or mouse in the woods or the backyard will jump onto the dog or cat when it goes outside. When the dog or cat comes back into the house, it brings the fleas with it.

Fleas bite our pets and make them scratch themselves. When fleas bite people, the people scratch themselves too! The bites of some kinds of fleas can make people very sick.

It is true that every living thing on the earth is here for a reason, but it is hard to find a good reason for fleas!

12

ANTS
(Order Hymenoptera)

If you've ever been to a picnic, you've probably seen ants. They like picnics almost as much as we do!

Look around your yard some summer day. You might see a little pile of dirt with a hole in the middle. This is called an ant hill, where ants have their nest. The ants use the hole to go in and out of their nest.

Most ants build their houses or nests in the ground. They make tiny caves and tunnels in the ground by carrying out bits of sand or dirt. The more bits of dirt they take out of the ground, the bigger the nest is, and the bigger the ant hill is. Some kinds of ants that live in Africa make ant hills that are taller than grownup people!

Some ants make their nests in wood. The wood might be part of a tree, or part of your house! The ants do not eat the wood. They make holes and tunnels in the wood just as they do in the ground. They take out tiny bits of wood and leave them outside the nest.

Ant

If one ant had to do all the work, it would take a long time to make an ant nest. But thousands of ants live together in big groups called colonies. Because there are so many of them, and because they all work together, they can build a large nest quite quickly.

There are usually three kinds of ants in each each colony: males, female workers, and queens. Each colony may have two or three queen ants, but it has thousands of workers.

Queen ants are much bigger than worker ants. All the queen has to do is lay eggs and eat. The workers feed and take care of the queens, take care of the baby ants, and build the nest and keep it in good repair.

There are lots of different kinds of ants, and they eat a lot of different things. They may eat seeds, grains, and roots. They may eat a special kind of liquid made by insects called aphids. Some ants grow their own mushrooms in special rooms deep in their nests. And some kinds of ants eat the same kinds of foods that people eat. This is why they come to our picnics, and sometimes it is why they come into our houses.

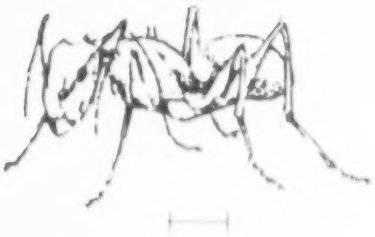
Ants that come into our houses are not really harmful, but most of us don't like to find ants in our food! The ants may come in through tiny cracks in the walls. Sometimes the ants in our houses are not looking for food at all. They are looking for water. We see them most often in our kitchens and bathrooms, because that's where the water is.

Most ants will not bother you if you leave them alone. If you bother them, most of them will bite. Some of them sting, and some can both bite and sting. Most ant bites don't hurt very much, and they don't hurt for very long. Stings are much more painful, and the pain lasts longer.

Ants are fun to watch. If you see ants around an ant hill, you can watch them closely for a long time, and they won't bother you if you don't bother them.

You can watch the ants carrying things into their nest. You can see them "talk" to each other. Just be sure you are *near* the ant hill and not *on* it. If you get too close to an ant hill, the ants will climb all over you, and they might bite or sting you.

Some of the things ants do are helpful to us. They break up dead plants into tiny bits and carry them into their nests. The bits of plants may help to make the soil richer. The ants get rid of a lot of dead plants this way.



Ant

Ants work very hard. They all work together to get their jobs done. When people work together, people can get a lot done, too.

13

BUMBLEBEES
(Order Hymenoptera)

As soon as the flowers begin to bloom in the spring, the queen bumblebee comes out of the ground. She visits the flowers to get their *nectar*. Nectar is a sort of sweet juice that is found in flowers. The nectar is the queen bumblebee's food, and she is very hungry. She has had nothing to eat all winter.

After the queen has eaten, she looks for a good place to nest. Most often she will choose a hole in the ground. She might choose a mouse's nest, if the mouse has moved out. The queen keeps looking until she finds a good nesting place. She only rests at night, or if the day is very rainy or cold.

All the other queen bumblebees nearby are looking for nesting places too. If two queens pick the same nesting place, they will fight each other. The queens will sting each other many times during the fight. The queen that is stung the most will lose the fight and will probably die. The queen that wins the fight will move into the good nesting place.

After the queen has found her nesting place, she keeps visiting the flowers. She gathers more nectar to eat, and she also gathers *pollen*, which is a powdery golden dust found in the blossoms. She packs the pollen onto her back legs and carries it to her nesting place. She uses the pollen to make tiny cups, and she lays an egg in each cup.

Have you ever seen a bird sitting on its eggs? The bird is keeping the eggs warm and dry. This is called *brooding* the eggs. The queen bumblebee broods her eggs too. The eggs must be kept warm or they will not hatch. The queen stops brooding only long enough to eat. Then she goes right back to keeping her eggs warm.

As the queen keeps on laying more eggs, the baby bumblebees (larvae) hatch out in their golden cups. They are worker bees, and they begin work as soon as they are big enough. They bring nectar and pollen from the flowers to the nest. They make honey from the nectar. They eat some of the honey and pollen themselves, and feed the rest of it to the new baby bees and to the queen bee.

The worker bumblebees can make wax, too. They use the wax to build tiny rooms called *cells*. The queen bee lays more eggs in the new wax cells. The workers then make wax covers for the cells, and the baby bees stay in the cells until their wings have grown. To feed the baby bees, the workers cut holes in the wax cell covers. They pass the food in to the baby bees, and then use more wax to seal up the cover again. When the baby bees are ready, they bite their way out of the cells and go to work right away just as the older bees did.

Bumblebee workers only live for about two weeks, but as the queen is laying new eggs all the time, more workers keep hatching out. The workers spend all their time gathering food. The only flowers with nectar and pollen may be miles from the nest, so the bees may have to fly long distances every day.

Bumblebees do not save any of their food. All the honey and pollen left after the queen and the worker bees eat is fed to the baby bees.

Near the end of summer, the queen bumblebee leaves the nest. She will find a mate, and look for a snug hole in the ground in which to spend the winter.

Once she is gone, and no more eggs are being laid in the nest, the rest of the bumblebees will die. The queen is the only one that lives through the winter.

Bumblebees are easy to see. If you stand quietly near some flowers in the garden, a bumblebee will probably come quite soon. They are black and yellow to orange, and they look very furry. Their bodies seem to be too big for their small wings. They may make a loud buzzing sound as they fly.

If you stand very still and don't bother them, you can watch the bumblebees as they come to the flowers. You can sometimes see how the bumblebee pushes its way into each flower. You can often see the big blobs of pollen on the bee's hind legs.

It is safe to *watch* bumblebees, but if you try to *touch* one, it will probably sting you. It might sting you many times. The place where a bumblebee stings will hurt quite a lot for a little while. Then it will hurt a little bit for a day or two more. After that, it will stop hurting, but it will probably itch for a while. There are a few people who get very sick from bee stings.

Bumblebees help us by taking pollen from one flower to another. This helps the flowers to make seeds, so we can have more flowers next year.

14

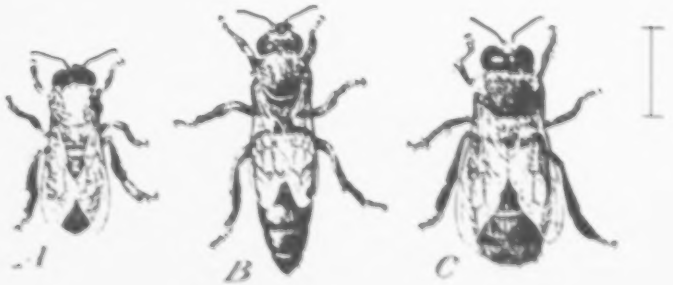
HONEYBEES
(Order Hymenoptera)

Honeybees live together in big groups called colonies. Each colony forms what is called a hive. The place where the bees live is called a hive, too.

A hive of honeybees may live in an old hollow tree in the woods. Sometimes honeybees make their hives inside the walls of buildings. But most honeybees live in big white boxes in country fields. These are special beehives that farmers put in their fields because they want the honeybees to live nearby.

The honeybees are probably very glad to have one of these special beehives. People build them very carefully, so they are just right for the honeybees to live in. A big group of honeybees will move into one of the boxes and begin to make their *honeycomb*.

Each hive has three kinds of honeybees: One queen, many female or worker bees, and many male or drone bees.



Honeybees

A — Worker
B — Queen
C — Drone

There is only one queen honeybee in each hive. She is much bigger than the other honeybees, and she is the most important bee of all. If she should die, or go away from the hive for very long, the other bees will die unless they can make a new queen.

The queen honeybee's only real job is to lay eggs. She is the mother of all the other bees in her hive. The worker bees bring her everything she needs, and take good care of her so she can spend all her time laying eggs.

The places where she lays her eggs are very special. This is how they are made: The first worker honeybees in a new hive build one tiny room. The little room is called a cell, and it is made of wax. The wax comes from inside the bodies of the worker bees. They chew and pat the wax and build it up until it forms a cell about half an inch deep. The cell has six sides.

The worker bees make more and more wax cells, sticking each one to the ones beside it. Because the cells are all one size, and because they all have six sides, they fit together perfectly with no space wasted in between them. The clusters of cells form long sheets, which are called honeycomb.

Honeybee on comb

The queen honeybee will lay one egg in each of the cells. The worker bees come along with more wax and make a tiny cover for each cell to keep the egg safe inside.

The worker bees make extra cells, exactly the same size as the egg cells. They use these extra cells to hold the honey they make from the flowers' nectar. This honey is their food. They make covers for the honey cells, too.

The worker bees will also make a very few cells that are larger than the others. The queen bee lays eggs in these cells too, but when the baby bees (larvae) hatch in these cells, they are fed a certain food that is different from the food given to the other baby bees. The baby bees in the big cells, with the special food, will grow up to be new queen bees, so if the hive loses its queen there will be a new one to take her place.

All summer long, the worker bees spend all the sunny daylight hours gathering nectar and pollen from the flowers. (Nectar is a kind of sweet juice found in flowers). The bees use the nectar and pollen for food. When they store the nectar in the extra wax cells, it turns into honey.

The bees have to gather enough nectar and pollen to feed themselves, feed the drone bees, feed the baby bees, and feed the queen. Then they have to gather enough extra food to last them all through the winter, when the flowers are gone.

98

The next time you see a bee working around some flowers, pick one blossom and open it carefully. Can you see any nectar, or anything that looks like juice in the flower? Usually you can't.

There is such a tiny amount of nectar in each flower that the bees have to visit hundreds of blossoms every day in order to get enough. They may have to fly long distances from the hive to find flowers with nectar in them. Summer is short, the flowers will die in the fall, and the bees don't have any time to waste.

Even so, the many bees working together to collect tiny drops of nectar can sometimes make so much honey that the hive has a lot more than the bees need for themselves. The farmers who have beehives in their fields will stack extra boxes on top of each hive so the bees will have a place to put the extra honey. Then the farmers can take some of the extra honey out of the hives in the autumn. They are very careful to leave enough honey in the hives so that the bees will not be hungry during the winter.

While the queen is busy in the hive laying eggs, and the workers are busy gathering nectar and taking care of the baby bees, what are the drones doing? Nothing! The drones don't do any work. They don't even gather their own food. They get their food from the worker bees.

The only reason there are drone bees at all is so that the queen will have a mate. At mating time, the queen will fly very high into the sky. All the drone bees will follow her, but only one will be strong enough to fly as high as the queen does. He will become her mate. Because only the strongest bees mate, the baby bees are sure to be strong too, and the whole hive will be strong.

Sometime before winter comes, the worker bees will kill all the drones, or drive them out of the hive into the cold. The drones will not live through the winter. If the drones stayed in the hive all winter, there might not be enough food to go around, and the whole hive would die. If the workers have plenty of food, they and the queen will live through the winter in comfort. When the flowers bloom again in the spring, the workers will begin making honey again.

Worker bees have stingers in their rear ends. Bumblebee stingers are smooth, but honeybee stingers have little hooks on them. When a honeybee stings another animal, the little hooks hold tight and the stinger pulls right out of the bee's body. Once it has lost its stinger, the honeybee usually dies. Each bumblebee can sting over and over, but a honeybee can sting only once.

Honeybees have a lot of work to do. The only thing that they are interested in is gathering enough food to last their hive all winter. If you bother them, or get in their way so they can't do their work, or if you keep them from getting back into their hive, they will probably sting you. This is bad for you, and very bad for the bees! But if you stand quietly and watch, you can see how the bees work. You can watch them moving in and out of the blossoms, and you can often see the little bundles of pollen on their hind legs. As long as you don't try to touch them, or to keep them away from the flowers, they won't bother you.

If a honeybee stings you, it will hurt a lot at first. It will make a big red mark, and your skin will puff up around the sting like a giant mosquito bite. The really bad pain goes away quite quickly, but the sting might itch for a few days. That's all that happens to most people when they are stung, although there are a few people who get very sick from bee stings.

If you are stung by a bee, you can help some of the pain go away if you put an ice cube on the sting. If you don't have an ice cube handy, you can find or make some nice cool mud and cover the sting with that. The coolness helps the sting feel better.

If a honeybee stings you, just try to remember: You will hurt for a little while, but the poor honeybee has lost its stinger and is probably dead!

Honeybees are very small creatures, and they don't look very important. If you're worried about being stung, you might think that getting rid of all the bees would be a good idea. But even though they don't look important, honeybees may well be the most important animals in the whole world.

As the bees go from flower to flower, they carry tiny bits of pollen from one flower to another. If there were no honeybees to do this, many flowers could not make seeds. So if there were no honeybees, many kinds of flowers and fruits would disappear. We would no longer have many of the things that we like to eat. It is thanks to the honeybees that we humans have as many kinds of things to eat as we do.

We use the bees' honey for food, and we use their wax for candles and crayons and other things, and we are glad that the bees give us these things. But we should not forget that the most important thing that the bees do for us is moving the pollen from flower to flower. And that is something we hardly notice at all.

For our own sakes as well as the bees', we should protect the bees and do what we can to keep them safe. We can plant lots of flowers around our houses. We can be careful about using chemicals or sprays that might kill them. And we can leave the bees alone and let them do their work.

Bibliography:

Borror, Donald J. and White, Richard E., *A Field Guide to the Insects of America North of Mexico*, Houghton Mifflin, Boston, 1970.

Fabre's Book of Insects, Tudor, 1939.

Howard, Leland O., *The Insect Book*, New York, Doubleday, 1902.

Lecht, Jane, *Honeybees*, National Geographic Society, 1973.

Index

Ants	12, 68-73
Bees	
Bumblebees	74-83, 102
Honeybees	12, 84-109
Blackflies	60-62
Crickets	39-43
Darning Needles	32
Dragonfly	24, 26-33
Drones	99-101
Fireflies	50
Fish, insects as food for	38, 62
Fleas	63-65
Flies	57-62
Grasshopper	34-38
Honey, Honeycomb	91-93, 95, 98
Instar	8
Ladybirds	52-54
Ladybugs	42-54
Larva	9-10
Latin names of insects	24-25
Maggots	58
Mantises	44-47
Metamorphosis	5
Complete	9-11
Simple	8
Molt	7
Mosquitoes	55-56
Nectar	74, 95-98
Nymph	8
Orders of insects	24-25
Pollen	21, 77, 83, 95
Pollination	21, 22, 107-109
Praying Mantis	44-47